

NITROGEN, PHOSPHOROUS AND POTASSIUM CONTENTS IN BROCCOLI AS INFLUENCED BY ORGANIC AND INORGANIC NUTRIENTS

SWAGATIKA SRICHANDAN

Krishi Vigyan Kendra, Larkipalli, Bolangir, Odisha

ABSTRACT

An experiment entitled “Nitrogen, phosphorous and potassium contents in broccoli as influenced by organic and inorganic nutrients” was conducted at Network project on Biofertilizer, OUAT, BBSR during the year Rabi 2011-12 and 2012-13. From the experiment it was found out that among ten treatments, the T₁₀ i.e 75% NP+100% K+bio inoculants+VC(5t/ha) proved to be the best on account of nitrogen, phosphorous and potassium content of both curd and plant. The nitrogen content of curd and plant was highest in T₁₀ i.e. 60.92 kg/ha and 37.97 kg/ha, the phosphorous content of curd and plant was also highest in T₁₀ i.e. 6.99 kg/ha and 6.78 kg/ha. Similarly the potassium content was also highest in curd and plant i.e. 34.36 kg/ha and 23.96 kg/ha respectively.

KEYWORDS : Biofertilizers, Vermicompost, FYM, NPK and Curd

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INTRODUCTION

Broccoli (*Brassica oleracea* var *italica*) belonging to the family Brassicaceae is an important cole crop after cabbage and cauliflower. It is native to Mediterranean region, cultivated in Italy in ancient Roman times. It contains vitamin A (130 times and 22 times higher than cauliflower and cabbage, respectively), thiamin, riboflavin, niacin, vitamin C and minerals like Ca, P, K and Fe. It has a very powerful anti-cancer compound, indole-3-carbinol, which boost DNA repair in cells and appears to block the growth of cancer cells. In India, broccoli is not so popular yet. However, the vegetable is gaining popularity during the last few years among the consumers particularly in and around bigger cities owing to the increased awareness about the nutritional properties as well as palatability. Nutrient management is one of the most important practices for profitable cultivation of any vegetable crop. Brassicas are heavy feeders that can grow on a variety of soils as long as the soils provide adequate nutrients and moisture and are well drained. A healthy soil will have a greater capacity to moderate the uptake of fertilizers and will allow a more balanced uptake of nutrients. Sustainable soil management maintains soil health and productivity by taking care of and increasing the soil organic matter.

MATERIALS AND METHODS

The present experiment entitled “Nitrogen, Phosphorous and potassium content in Broccoli as influenced by organic and inorganic nutrients” was carried out at Network project on Biofertilizer, OUAT, BBSR during the year Rabi 2011-12 and 2012-13 in Randomized block design with 10 treatments replicated thrice. The experimental plot size was length 3m and breadth 2.8 m. Spacing adopted was 50cmX 40 cm. The gross area of the experimentation was 367.92 m². The variety taken for the trial was Puspa (F₁ hybrid, Seminis company). Soil test based fertilizer recommendation was 120:30:60 NPK kg/ha. Bio fertilizers such as Azotobacter,

Azospirillum and PSB were mixed in the ratio of 1:1:1. Besides biofertilizers, FYM and Vermicompost were used @ 10 t/ha and 5 t/ha respectively. The experimental treatments are listed below.

Table 1

Serial No.	Notation	Treatments
1	T ₁	Absolute control
2	T ₂	100% NPK
3	T ₃	100% NPK +100% FYM
4	T ₄	100% NPK + 100% V.C
5	T ₅	100% NPK +50%FYM +50% VC
6	T ₆	100% NPK +50%FYM + 25% VC +25% VC
7	T ₇	100% NPK +50% V.C +50%VC
8	T ₈	100% NPK + 50%V.C +25%VC +25%VC
9	T ₉	75%NP +100% K+ Bioinoculant+100% FYM
10	T ₁₀	75 % NP + 100% K +Bioinoculant+100% VC

RESULTS AND DISCUSSIONS

In table 1 maximum nitrogen content of the curd was found out in T₁₀ (60.93 kg/ha and 60.91 kg/ha) also that was statistically significant than all other treatments. Similarly, as per Table 2, nitrogen content of the plant was recorded to be highest in T₁₀ (36.20 kg/ha and 39.74 kg/ha) during 2011-12 and 2012-13 respectively. In Table 3 and Table 4, maximum phosphorous content of curd and plant during 2011-12 and 2012-13 was (5.44 kg/ha, 7.37 kg/ha and 6.53kg/ha, 7.04 kg/ha). In Table 5 potassium content of curd is maximum in T₁₀ during 2011-12 and 2012-13 (33.72 kg/ha and 34.99 kg/ha). Similarly, in Table 6 potassium content of plant was highest in T₁₀ (23.64 kg/ha and 24.27 kg/ha). Combined use of biofertilizer and organic manures increased the productivity of broccoli crop. Chemical fertilizer mainly nitrogen is highly volatile in nature and get leached away. But phosphorous and potassium are gradually available to the plant. Biofertilizer keeps the nutrient in bound form and make it available to the crop. In other words its role is like a chelating agent for all the nutrients excepting nitrogen. The highest values of nitrogen, phosphorous and potassium content of both plant and curd was noticed in T₁₀. The crop responded positively to the direct and residual effect of graded dose of inorganic nutrients integrated with organic and biological sources either alone or mostly together. The individual or synergistically availability of nitrogen, phosphorous and potassium resulted in increased in vegetative growth, thus increase in yield. This corroborates the findings of Evaraats *et al* (2012) in crop broccoli, Sable and Bhamare (2011) in cauliflower, Sharma (2009) in broccoli and Ranwat *et al*. (2014) in broccoli crop.

Table 2: Nitrogen Content of Curd of Broccoli

Sl. No.	Treatments	N- Content of Curd (Kg/Ha)		
		2011-12	2012-13	Pooled
1	Absolute control	2.91	3.11	3.01
2	100% NPK	23.38	20.96	22.17
3	100% NPK +100% FYM	33.35	35.08	34.21
4	100% NPK + 100% V.C	42.03	45.97	44.00
5	100% NPK +50%FYM +50% VC	44.01	46.43	45.25
6	100% NPK +50%FYM + 25% VC +25% VC	44.30	51.48	47.88
7	100% NPK +50% V.C +50%VC	49.77	54.67	52.22
8	100% NPK + 50%V.C +25%VC +25%VC	56.07	56.24	56.16
9	75%NP +100% K+ Bioinoculant+100% FYM	56.35	58.13	57.24
10	75 % NP + 100% K +Bioinoculant + 100% VC	60.93	60.91	60.92
	SEM±	0.34	0.32	0.19
	CD(0.05)	1.02	0.96	0.54

Table 3: Nitrogen Content of Plant of Broccoli

Sl. No.	Treatments	N- Content of Plant (Kg/Ha)		
		2011-12	2012-13	Pooled
1	Absolute control	1.29	1.07	1.19
2	100% NPK	16.91	17.91	17.41
3	100% NPK +100% FYM	18.29	20.87	19.58
4	100% NPK + 100% V.C	21.27	23.73	22.50
5	100% NPK +50%FYM +50% VC	23.06	28.21	25.63
6	100% NPK +50%FYM + 25% VC +25% VC	23.97	30.67	27.32
7	100% NPK +50% V.C +50% VC	27.88	33.44	30.66
8	100% NPK + 50%V.C +25%VC +25%VC	31.15	35.71	33.43
9	75%NP +100% K+ Bioinoculant+100% FYM	34.78	37.77	36.28
10	75 % NP + 100% K +Bioinoculant + 100% VC	36.20	39.74	37.97
	SEM \pm	0.36	0.39	0.44
	CD(0.05)	1.08	1.18	1.21

Table 4: Phosphorous Content of Curd of Broccoli

Sl. No.	Treatments	P-Content of Curd (Kg/Ha)		
		2011-12	2012-13	Pooled
1	Absolute control	0.23	0.34	0.29
2	100% NPK	1.88	1.70	1.79
3	100% NPK +100% FYM	2.98	3.16	3.07
4	100% NPK + 100% V.C	3.88	3.58	3.73
5	100% NPK +50%FYM +50% VC	4.14	4.01	4.08
6	100% NPK +50%FYM + 25% VC +25% VC	4.63	5.07	4.85
7	100% NPK +50% V.C +50% VC	4.81	5.15	4.98
8	100% NPK + 50%V.C +25%VC +25%VC	4.82	5.43	5.13
9	75%NP +100% K+ Bioinoculant+100% FYM	5.78	6.04	5.91
10	75 % NP + 100% K +Bioinoculant + 100% VC	5.44	7.37	6.99
	SEM \pm	0.38	0.31	0.18
	CD(0.05)	1.12	0.92	0.53

Table 5: Phosphorous Content of Plant of Broccoli

Sl. No.	Treatments	P-Content of Plant (Kg/Ha)		
		2011-12	2012-13	Pooled
1	Absolute control	0.21	0.20	0.21
2	100% NPK	2.94	1.95	2.45
3	100% NPK +100% FYM	3.17	2.73	2.95
4	100% NPK + 100% V.C	3.27	3.65	3.46
5	100% NPK +50%FYM +50% VC	4.33	4.02	4.18
6	100% NPK +50%FYM + 25% VC +25% VC	4.69	4.52	4.61
7	100% NPK +50% V.C +50% VC	5.14	5.74	5.44
8	100% NPK + 50%V.C +25%VC +25%VC	5.49	6.10	5.80
9	75%NP +100% K+ Bioinoculant+100% FYM	6.12	6.62	6.37
10	75 % NP + 100% K +Bioinoculant + 100% VC	6.53	7.04	6.78
	SEM \pm	0.31	0.36	0.20
	CD(0.05)	0.92	1.09	0.56

Table 6: Potassium Content of Curd of Broccoli

Sl. No.	Treatments	K-Content of Curd (Kg/Ha)		
		2011-12	2012-13	Pooled
1	Absolute control	1.05	1.32	1.19
2	100% NPK	10.78	12.81	11.79
3	100% NPK +100% FYM	13.16	15.12	14.14
4	100% NPK + 100% V.C	17.63	21.18	19.41

Table 6: Contd.,

5	100% NPK +50%FYM +50% VC	18.86	21.12	19.99
6	100% NPK +50%FYM + 25% VC +25% VC	23.03	24.89	23.96
7	100% NPK +50% V.C +50% VC	25.83	26.72	26.28
8	100% NPK + 50%V.C +25%VC +25%VC	29.88	32.76	31.32
9	75%NP +100% K+ Bioinoculant+100% FYM	30.79	33.97	32.38
10	75 % NP + 100% K +Bioinoculant + 100% VC	33.72	34.99	34.36
	SEM±	0.36	0.35	0.26
	CD(0.05)	1.07	1.04	0.73

Table 7: Potassium Content of Plant of Broccoli

Sl. No	Treatments	K-Content of Plant (Kg/Ha)		
		2011-12	2012-13	Pooled
1	Absolute control	0.69	0.86	0.78
2	100% NPK	9.19	8.97	9.08
3	100% NPK +100% FYM	11.45	10.37	10.91
4	100% NPK + 100% V.C	12.69	13.34	13.02
5	100% NPK +50%FYM +50% VC	13.11	14.99	14.05
6	100% NPK +50%FYM + 25% VC +25% VC	14.79	15.93	15.36
7	100% NPK +50% V.C +50%VC	17.87	20.45	19.16
8	100% NPK + 50%V.C +25%VC +25%VC	18.68	19.86	19.27
9	75%NP +100% K+ Bioinoculant+100% FYM	20.14	20.91	20.53
10	75 % NP + 100% K +Bioinoculant + 100% VC	23.64	24.27	23.96
	SEM±	0.33	1.11	0.46
	CD(0.05)	0.99	3.29	1.29

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